



Federal Communications Commission  
Washington, D.C. 20554

December 14, 2021

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DA 21-1556

RE: **PTC-220 LLC, Call Sign WRKK374**

Dear Mr. Martin:

The Mobility Division (Division) of the Wireless Telecommunications Bureau (Bureau) hereby grants the License Modification Application<sup>1</sup> of PTC-220, LLC (PTC-220)—a joint venture of the nation's seven Class I freight railroads<sup>2</sup>—for permanent authority to operate 547 positive train control (PTC) wireless radio base stations, 5,566 PTC wireless radio wayside stations,<sup>3</sup> and related mobile (locomotive) stations under Automated Maritime Telecommunications System (AMTS) Call Sign WRKK374.<sup>4</sup> For the reasons discussed below, we also grant PTC-220's related requests for waiver of certain Commission rules to facilitate its members' PTC deployment.<sup>5</sup>

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<sup>1</sup> ULS File No. 0009583919 (filed June 11, 2021, amended June 17, July 12, Aug. 17, and Sept. 27, 2021) (License Modification Application).

<sup>2</sup> PTC-220 was formed to acquire and manage the necessary spectrum resources for its member railroads to implement PTC systems. ULS File No. 0009583919, Request for Waiver of Section 80.215(i) at 1 (filed Aug. 17, 2021) (PTC-220 Section 80.215(i) Waiver Request).

<sup>3</sup> Base stations typically operate at antenna heights of 75 to 150 feet above ground level (AGL) and at effective radiated power (ERP) levels ranging from 100 to 400 watts. ULS File No. 0009583919, "Engineering Study Report and Plan to Limit Interference from AMTS Stations to Over-the Air Reception of TV Channels 13 and 10, Covering WRKK374 (AMTS Region 10)" at 10, dated Aug. 16, 2021 (filed Aug. 17, 2021) (PTC-220 Engineering Report). Wayside stations are radio sites at intermediate or control point railroad signals and have a typical antenna height of 30 to 60 feet AGL. *Id.* at 10-11. They communicate with approaching locomotives and nearby base stations at ERP levels up to 76 watts. *Id.* at 11.

<sup>4</sup> The AMTS rules define two station classes: coast stations and ship stations. 47 CFR § 80.5 (defining a coast station as a "land station in the maritime mobile service" and a ship station as a "mobile station in the maritime mobile service located on-board a vessel which is not permanently moored"). The Commission amended the AMTS rules in 1997 to permit AMTS stations to serve fixed, mobile, and handheld units on land, in addition to marine vessels. *Amendment of the Commission's Rules Concerning Maritime Communications*, PR Docket No. 92-257, Second Report and Order and Second Further Notice of Proposed Rule Making, 12 FCC Rcd 16949, 16964-65 paras. 24-25 (1997). Because they are both fixed stations, we regulate PTC base and wayside stations as AMTS coast stations for licensing purposes. And because they are mobile, we regulate locomotive stations as AMTS ship stations for licensing purposes.

<sup>5</sup> ULS File No. 0009583919, Request for Waiver of 47 C.F.R. § 1.913(b) and Schedule D Instructions (PTC-220 Schedule D Waiver Request) and PTC-220 Section 80.215(i) Waiver Request (both filed Aug. 17, 2021).

Today's action will enable PTC-220's seven member railroads<sup>6</sup> to deploy Congressionally-mandated, interoperable PTC safety systems on rail lines serving 16 western states.<sup>7</sup> Our action also will benefit Amtrak and other railroads that operate as tenants on the members' rail networks as well as passenger and commuter railroads leasing spectrum to deploy PTC on their own lines in the license area.<sup>8</sup> This grant of permanent operating authority is subject to certain conditions adopted below.

## I. BACKGROUND

*Positive Train Control.* The *Rail Safety Improvement Act of 2008*, as amended by the *Positive Train Control Enforcement and Implementation Act of 2015* (together, the Rail Safety Act), required most U.S. freight, passenger, and commuter railroads to install and operate interoperable PTC systems by December 31, 2018.<sup>9</sup> Four railroads timely met this deadline.<sup>10</sup> As the Rail Safety Act permits, the remaining railroads subject to the PTC mandate, including PTC-220's member railroads, requested up to a 2-year extension, until December 31, 2020, to implement PTC.<sup>11</sup> The FRA found that these railroads met the statutory criteria necessary to qualify for an extended implementation schedule and, subsequently, that they met their extended deadlines.<sup>12</sup>

PTC systems are designed to reduce the risk of human-error rail accidents, by “prevent[ing] train-to-train collisions, over-speed derailments, incursions into established work zone limits, and the movement of a train through a switch left in the wrong position.”<sup>13</sup> The U.S. rail industry has chosen to implement PTC through wireless networks that use radio spectrum. These networks have the capacity to enable real-time information sharing between trains, rail wayside devices, and “back office” applications, regarding train movement authorities, speed restrictions, train position and speed, and the state of signal and switch devices.

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<sup>6</sup> PTC-220's member railroads include BNSF Railway Company, Canadian National Railway Company, Canadian Pacific Railway Company, CSX Corporation, Kansas City Southern, Norfolk Southern Corporation, and Union Pacific Corporation. PTC-220 Section 80.215(i) Waiver Request at 1, n.4.

<sup>7</sup> The states are Arizona, California, Colorado, Idaho, Minnesota, Montana, North Dakota, Nebraska, New Mexico, Nevada, Oklahoma, Oregon, South Dakota, Texas, Utah, and Wyoming. ULS File No. 0009583919, Revised Schedule D PTC Site Data (filed Aug. 17, 2021).

<sup>8</sup> PTC-220 Section 80.215(i) Waiver Request at 3.

<sup>9</sup> *Rail Safety Improvement Act of 2008*, Pub. L. No. 110-432, § 104, 122 Stat. 4848, 4857 (2008), amended by the *Positive Train Control Enforcement and Implementation Act of 2015*, Pub. L. No. 114-73, § 1302, 129 Stat. 568, 576 (2015). The Federal Railroad Administration (FRA) is responsible for approving each railroad's PTC system, including design, testing, and implementation and for ensuring compliance with the Rail Safety Act and FRA regulations implementing that statute. Positive Train Control (PTC) Information (R&D), Federal Railroad Administration (last updated Nov. 13, 2019), <https://www.fra.dot.gov/Page/P0152> (last visited Dec.13, 2021).

<sup>10</sup> Statement on Positive Train Control Implementation, U.S. Department of Transportation (last updated Dec. 31, 2018), <https://www.transportation.gov/briefing-room/statement-positive-train-control-implementation> (last visited Dec. 13, 2021).

<sup>11</sup> *Id.*

<sup>12</sup> Positive Train Control (PTC), U.S. Department of Transportation (last updated Jan. 4, 2021), <https://railroads.dot.gov/train-control/ptc/positive-train-control-ptc> (last visited Dec. 13, 2021).

<sup>13</sup> 49 U.S.C. § 20157(i)(5).

*Spectrum Acquisition and Authorization.* On July 16, 2019, Thomas K. Kurian (Kurian) and PTC-220 filed an application to disaggregate, partition, and assign AMTS spectrum from Kurian's Call Sign WQCP809 to PTC-220.<sup>14</sup> On July 24, 2019, the Wireless Telecommunications Bureau (Bureau) placed the Assignment Application on public notice.<sup>15</sup> Warren Havens and the Polaris PNT Group filed a petition to deny the Assignment Application.<sup>16</sup> On November 23, 2020, the Mobility Division denied that petition and initiated processing of the Assignment Application.<sup>17</sup> The Mobility Division consented to the Assignment Application on November 24, 2020<sup>18</sup> and, on January 12, 2021, PTC-220 consummated the AMTS spectrum acquisition, resulting in the grant of Call Sign WRKK374 (219.5 to 220 MHz).<sup>19</sup>

PTC-220 previously acquired numerous 220 MHz spectrum licenses for its members to deploy PTC throughout the country.<sup>20</sup> However, the need for its members to deploy two additional PTC common channels—which locomotive radios will use to attach to PTC base stations and receive instructions regarding the proper frequency to operate on in an area—and the lack of additional suitable 220 MHz spectrum drove PTC-220's acquisition of 500 kilohertz of immediately adjacent AMTS spectrum (from 219.5 to 220 MHz).<sup>21</sup> In addition to the spectrum PTC-220 acquired in AMTS Region 10 under Call Sign WRKK374, PTC-220 has acquired 219 MHz spectrum in AMTS Regions 2, 4, 5, and 6 (Call Signs WRDI936, WRDH825, WRDH826, and WRDH972, respectively), providing its members AMTS spectrum coverage in most of the country.<sup>22</sup>

In the short term, PTC-220's member railroads will use the AMTS spectrum to improve PTC reliability by implementing two additional common channels.<sup>23</sup> In the longer term, the railroads will leverage the AMTS spectrum to: (1) expand PTC deployment onto non-mandatory lines; (2) support other, related train control safety applications, including End-of-Train devices and distributed power

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<sup>14</sup> ULS File No. 0008694347, Assignment Application (filed July 16, 2019).

<sup>15</sup> *Wireless Telecommunications Bureau Assignment of License Authorization Applications, Transfer of Control of License Applications, and De Facto Transfer Lease Applications, and Designated Entity Reportable Eligibility Event Applications Accepted for Filing*, Public Notice, Report No. 14227 (WTB rel. July 24, 2019).

<sup>16</sup> ULS File No. 0008694347, (Errata Copy) Petition to Deny Under 47 USC § 309(d) (and associated FCC rules) or in the Alternative Informal Request Under 47 CFR § 1.41 at 1 (filed Aug. 7, 2019).

<sup>17</sup> *Thomas K. Kurian*, Order, DA 20-1391, 2020 WL 6955421 (WTB MD 2020).

<sup>18</sup> *Wireless Telecommunications Bureau Assignment of License Authorization Applications, Transfer of Control of License Applications, De Facto Transfer Lease Applications and Spectrum Manager Lease Notifications, Designated Entity Reportable Eligibility Event Applications, and Designated Entity Annual Reports Action*, Public Notice (WTB Dec. 2, 2020), 2020 WL 7121501.

<sup>19</sup> *Wireless Telecommunications Bureau Assignment of License Authorization Applications, Transfer of Control of License Applications, De Facto Transfer Lease Applications and Spectrum Manager Lease Notifications, Designated Entity Reportable Eligibility Event Applications, and Designated Entity Annual Reports Action*, Public Notice (WTB Jan. 21, 2021), 2021 WL 248842; ULS File No. 0008694347 (notice of consummation filed Jan. 12, 2021).

<sup>20</sup> PTC-220 Section 80.215(i) Waiver Request at 2-3. PTC-220 holds 31 separate 220 MHz licenses. *Id.* at n.7.

<sup>21</sup> *Id.* at 2-3.

<sup>22</sup> *Id.* at 3.

<sup>23</sup> *Id.* at 2.

systems; and (3) support future safety-related functions, such as improvements to the monitoring of grade crossing equipment.<sup>24</sup>

*License Modification Application.* Although AMTS geographic licensees generally are authorized to deploy base stations anywhere within their licensed geographic service areas, section 80.215(h)(2) of the Commission's rules requires individual licensing of base stations located less than 169 kilometers (105 miles) from a channel 13 TV station, or less than 129 kilometers (80 miles) from a channel 10 TV station.<sup>25</sup> PTC-220 seeks to modify its geographic area license under Call Sign WRKK374 to individually authorize, on a permanent basis and subject to its license term, operation of 547 PTC base and 5,566 PTC wayside stations.<sup>26</sup>

*PTC-220 Engineering Report.* Pursuant to section 80.215(h)(2) of the Commission's rules,<sup>27</sup> PTC-220 performed an interference study, which addresses the potential number of channel 10 and channel 13 over-the-air (OTA) TV households that could be impacted by operation of PTC-equipped base, wayside, and mobile stations in the license area.<sup>28</sup> We discuss the report's findings below.

*Interference Mitigation Plan.* As required by section 80.215(h)(2) of the Commission's rules, PTC-220 submitted a plan to limit potential interference from operation of the proposed base and wayside stations to OTA television reception.<sup>29</sup> PTC-220 has certified that it, its members, and spectrum lessees will adhere to this plan.<sup>30</sup> We discuss the plan below.

*PTC-220 Waiver Requests.* PTC-220 requests a waiver of section 80.215(i) of the Commission's rules to operate locomotive radios at up to 50 watts transmitter power output (TPO)<sup>31</sup> with an effective radiated power (ERP) up to 39 watts.<sup>32</sup> PTC-220 also requests a waiver of section 1.913(b) of the Commission's rules to the extent the rule requires PTC-220 to file a separate FCC Form 601, Schedule D for authorization of each of its 6,113 PTC base and wayside radio stations.<sup>33</sup> For the reasons stated below, we grant the requested rule waivers.

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<sup>24</sup> *Id.* at 2-4.

<sup>25</sup> 47 CFR § 80.215(h)(2); *see also id.* § 80.475(a)(1). AMTS base stations are authorized "subject to the condition that no harmful interference will be caused to television reception except that TV services authorized subsequent to the filing of the AMTS station application will not be protected." *Id.* § 80.215(h).

<sup>26</sup> PTC-220 Engineering Report at 11.

<sup>27</sup> 47 CFR § 80.215(h)(2).

<sup>28</sup> PTC-220 Engineering Report. Tom Peters, an engineering consultant to PTC-220, prepared the report. ULS File No. 0009583919, Engineering Certification of Tom Peters, dated Aug. 16, 2021 (filed Aug. 17, 2021).

<sup>29</sup> ULS File No. 0009583919, Interference Mitigation Plan, PTC-220 Engineering Report at 20 (Interference Mitigation Plan).

<sup>30</sup> ULS File No. 0009583919, Certification of PTC-220, LLC, by Tom Burns, its President, dated Aug. 9, 2021 (filed Aug. 17, 2021) (PTC-220 Burns Certification).

<sup>31</sup> TPO is the power level at the output terminals of a radio transmitter.

<sup>32</sup> PTC-220 Section 80.215 Waiver Request at 4-6, citing 47 CFR § 80.215(i) (AMTS mobile radio stations must have a TPO "not exceeding 25 watts and an ERP not exceeding 18 watts" unless certain conditions are met).

<sup>33</sup> PTC-220 Schedule D Waiver Request at 1-2, citing 47 CFR § 1.913(b).

*Broadcaster Notification.* As required by section 80.475(a)(2) of the Commission's rules,<sup>34</sup> PTC-220 served written notice of the License Modification Application on potentially affected broadcast stations on June 15, 2021 and, as amended, on August 17 and September 27, 2021.<sup>35</sup> No broadcast station or other party has filed a comment on, or opposed, PTC-220's License Modification Application.

## II. DISCUSSION

We have reviewed the License Modification Application, Engineering Report, Interference Mitigation Plan, and all other filings in the record before us, and find that the public interest in facilitating rail safety will be served by granting PTC-220 permanent authority to operate the 547 PTC base stations, 5,566 wayside stations,<sup>36</sup> and related mobile stations.<sup>37</sup>

### A. Authorization of Wireless Mobile (Locomotive) Radio Stations

We first address PTC-220's request for authorization to operate locomotive radios at up to 50 watts TPO with an ERP up to 39 watts under Call Sign WRKK374.<sup>38</sup>

Section 80.215(i) of the Commission's rules provides that AMTS mobile radio stations (here, locomotive radios) must have a TPO "not exceeding 25 watts and an ERP not exceeding 18 watts."<sup>39</sup> The rule permits increased TPO, up to 50 watts, provided two conditions are met: (1) "[i]ncreases exceeding 25 watts are made only by radio command from the controlling [base] stations,"<sup>40</sup> and (2) TPO "is 25 watts or less when external radio commands are not present."<sup>41</sup> Section 80.215(j) provides that mobile radio stations that meet both these conditions are "exempted from the limitation of 18 watts ERP when operating in specific geographical areas identified in a plan for the use of higher power."<sup>42</sup> PTC-220 seeks a waiver of the two conditions in sections 80.215(i)(1) and (2) (which it cannot meet for technical reasons) so that its members may operate locomotive radios at up to 50 watts TPO with an ERP up to 39 watts.<sup>43</sup> We grant PTC-220's request for the reasons that follow.<sup>44</sup>

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<sup>34</sup> 47 CFR § 80.475(a)(2).

<sup>35</sup> ULS File No. 0009583919, Certificates of Service (filed July 12 and Aug. 17, 2021); ULS File No. 0009583919, Update Regarding Change in Low Power TV Stations (filed Sept. 27, 2021) (PTC-220 September 27, 2021 Update).

<sup>36</sup> ULS File No. 0009583919, Schedule D PTC Site Data (filed July 12, 2021).

<sup>37</sup> PTC-220 Engineering Report at 12 and n.28 (locomotive radio parameters).

<sup>38</sup> Section 80.215 Waiver Request at 5-6. ERP is defined as "[t]he product of the power supplied to the antenna multiplied by the gain of the antenna referenced to a half-wave dipole." 47 CFR § 1.907.

<sup>39</sup> 47 CFR § 80.215(i).

<sup>40</sup> *Id.* § 80.215(i)(1).

<sup>41</sup> *Id.* § 80.215(i)(2).

<sup>42</sup> *Id.* § 80.215(j). PTC-220 filed a Section 80.215(j) Plan. ULS File No. 0009583919, Section 80.215(j) Plan for Use of Higher Mobile Power (filed Aug. 17, 2021) (PTC-220 Section 80.215(j) Plan).

<sup>43</sup> PTC-220 Section 80.215(i) Waiver Request at 6-7.

<sup>44</sup> See *Southern California Regional Rail Authority*, Call Sign WQYR421, Letter Order, DA 20-1259, 35 FCC Rcd 11912 (WTB MD Oct. 23, 2020) (granting the Southern California Regional Rail Authority (SCRRA) the same relief that PTC-220 requests here, to enable SCRRA's PTC implementation and that of three tenant railroads—Amtrak, the BNSF Railway, and the Union Pacific Railroad—using AMTS spectrum).

*Mobile Radio Transmitter Power Output Limit.* The Rail Safety Act requires U.S. railroads to deploy interoperable PTC systems so that when a railroad enters another's territory as a tenant, it can safely use the host rail's PTC system where required.<sup>45</sup> To comply with this statutory interoperability requirement, PTC-220's member railroads have deployed an integrated PTC system, which uses a combination of their base and wayside radio stations operating on 220-222 MHz band spectrum.<sup>46</sup> Due to a shortage of available 220-222 MHz band spectrum for PTC deployment, PTC-220 has created a common pool of PTC spectrum channels drawn from 220-222 MHz Band spectrum and from adjacent band AMTS spectrum licensed to PTC-220.<sup>47</sup> PTC-220 explains that to implement interoperable PTC systems that can use channels drawn from the common spectrum pool, it requires a limited waiver of section 80.215(i)'s power limits.<sup>48</sup>

PTC-220's seven member railroads and their tenant railroad partners have deployed more than 16,000 Meteorcomm PTC locomotive radios across the country,<sup>49</sup> using the spectrum PTC-220 holds in the 220-222 MHz band. Consistent with applicable Part 90 rules,<sup>50</sup> the railroads configured their mobile radios to operate at a constant 50-watt TPO in the 220-222 MHz band.<sup>51</sup> PTC-220 states that the installed base of "locomotive radios do not have the ability to have their power dynamically controlled by" base stations.<sup>52</sup> Instead, adjustment of a radio's TPO "would require that a technician manually connect to the radio to program in the new value."<sup>53</sup> PTC-220 explains that "[a]s a result, the radio's power is not variable as it moves from one base station's coverage to another's."<sup>54</sup>

We evaluate PTC-220's request for waiver under section 1.925(b)(3) of the Commission's rules. Under section 1.925(b)(3), the Commission may grant a request for waiver if it is shown either that (i) the underlying purpose of the rule(s) would not be served or would be frustrated by application to the instant case, and that a grant of the requested waiver would be in the public interest, or (ii) in view of unique or unusual factual circumstances, application of the rule(s) would be inequitable, unduly burdensome or contrary to the public interest, or the applicant has no reasonable alternative.<sup>55</sup> We grant PTC-220's waiver request under the second prong of the Commission's waiver standard.<sup>56</sup>

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<sup>45</sup> 49 U.S.C. § 20157(a)(2)(A)(i)(1) (a railroad "must provide for interoperability of the system with the movements of trains of other railroad carriers over its lines"). The Rail Safety Act defines "interoperability" as "the ability to control locomotives of the host railroad and tenant railroad to communicate with and respond to the positive train control system, including uninterrupted movements over property boundaries." *Id.* § 20157(i)(3).

<sup>46</sup> PTC-220 Section 80.215(i) Waiver Request at 2.

<sup>47</sup> *Id.* at 2-3.

<sup>48</sup> *Id.* at 6.

<sup>49</sup> *Id.* at 6-7. The radio's specifications are attached as Exhibit 1 to the PTC-220 Section 80.215(j) Plan.

<sup>50</sup> 47 CFR § 90.729(b).

<sup>51</sup> PTC-220 Section 80.215(i) Waiver Request at 6.

<sup>52</sup> *Id.* at 7.

<sup>53</sup> *Id.* at 6.

<sup>54</sup> *Id.*

<sup>55</sup> 47 CFR § 1.925(b)(3). The Commission also may waive its rules for good cause shown. *Id.* § 1.3.

<sup>56</sup> *Id.* § 1.925(b)(3)(ii).

We find that in view of the unique and unusual circumstances here, including Congress' mandate that PTC safety systems be interoperable, application of the two conditions required to operate mobile radio transmitters at up to 50 watts TPO in the AMTS band—(1) that TPO increases exceeding 25 watts are made only by base station radio command;<sup>57</sup> and (2) that TPO must be 25 watts or less when external radio commands are not present<sup>58</sup>—would be contrary to the public interest in the safety of life and property. Second, we find that not permitting PTC-220's member railroads to operate mobile radios at 50 watts TPO would be contrary to the public interest because it would preclude sharing of scarce spectrum resources, which are needed for robust interoperable PTC deployment throughout the country. Third, we find that PTC-220 has no reasonable alternative. PTC-220's member railroads have installed more than 16,000 locomotive radios that operate at a constant 50 watts TPO in the 220-222 MHz band; the record shows that it is not possible to program the radios to operate at 50 watts TPO and satisfy the condition that TPO be 25 watts or less when external radio commands are not present.

Given the totality of the circumstances in the record before us and for the reasons stated above, we hereby waive sections 80.215(i)(1) and (2) of the Commission's rules to the extent necessary and authorize PTC-220 to operate PTC locomotive radios at 50 watts TPO under Call Sign WRKK374.<sup>59</sup>

*Mobile Radio Effective Radiated Power Limits.* PTC-220 also requests waiver of section 80.215(i)'s 18-watt mobile radio ERP limit so that its members can operate PTC locomotive radios at up to 39 watts ERP.<sup>60</sup> As explained above, although section 80.215(i) generally limits mobile radio ERP to 18 watts,<sup>61</sup> section 80.215(j) exempts mobile radio operations from this ERP limit provided the two conditions for exceeding section 80.215(i)'s 25-watt TPO limit are met “when operating in specific geographical areas identified in a plan for the use of higher power.”<sup>62</sup>

As required by section 80.215(j), PTC-220 has submitted a plan to deploy mobile radios with a peak ERP from 24 to 39 watts in specific geographical areas.<sup>63</sup> The plan includes 58 maps of the specific rail lines where PTC mobile radios will operate<sup>64</sup> and a showing regarding the radios' peak ERP levels.<sup>65</sup> PTC-220 explains that no appreciable additional interference would result from operation of the mobile radios because their transmit duty cycle is extremely low, their antennas are much lower to the ground than base and wayside station antennas, and they operate at much lower power levels.<sup>66</sup>

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<sup>57</sup> *Id.* § 80.215(i)(1).

<sup>58</sup> *Id.* § 80.215(i)(2).

<sup>59</sup> This waiver extends to all locomotive radio operations under Call Sign WRKK374.

<sup>60</sup> Depending on their configuration, PTC-220's member railroads' locomotive radios operate from 24 to 39 watts ERP. PTC-220 Section 80.215(j) Plan at 2.

<sup>61</sup> 47 CFR § 80.215(i).

<sup>62</sup> *Id.* § 80.215(j).

<sup>63</sup> PTC-220 Section 80.215(j) Plan.

<sup>64</sup> The maps are attached to the PTC-220 Section 80.215(j) Plan.

<sup>65</sup> PTC-220 Section 80.215(j) Plan at 1-2.

<sup>66</sup> PTC-220 Section 80.215(j) Plan at 3-4 (mobile radios' 30% duty cycle is rarely met; the manufacturer estimates they typically transmit less than one percent of the time). *Id.* at 4 (mobile radio antennas are mounted on the top of locomotives from 17-19 feet AGL, while wayside antennas are mounted at 60-80 feet AGL and base station

Above we waive the two conditions of section 80.215(i) required to use mobile radios with TPO exceeding 25 watts ERP. Once these two conditions are met (or waived, as here), a licensee is exempt from the rule's 18-watt ERP limit, provided it has submitted an appropriate plan for use of higher mobile power under section 80.215(j). We have closely reviewed PTC-220's Section 80.215(j) Plan and find that the plan meets the requirements for exemption of mobile radio operations from section 80.215(i)'s 18-watt ERP limit. Accordingly, we hereby authorize PTC-220 to operate mobile radios at up to 39 watts ERP under Call Sign WRKK374.<sup>67</sup>

#### **B. Authorization of Wireless Radio Base and Wayside Radio Stations**

We now address PTC-220's request for authorization to operate 546 PTC wireless base stations and 5,566 PTC wireless wayside stations.

*Request for Waiver of 47 CFR § 1.913(b).* We first address PTC-220's request to provide PTC base and wayside radio station data in a consolidated format. Pursuant to sections 1.3 and 1.925(b)(3)(ii) of the Commission's rules,<sup>68</sup> PTC-220 requests that we waive section 1.913(b) of the Commission's rules to the extent the rule requires PTC-220 to file a separate FCC Form 601, Schedule D for authorization of each fixed radio station.<sup>69</sup> PTC-220 states that the PTC mandate and the number of required PTC base and wayside radio stations included in its License Modification Application present unique factual circumstances that would render the requirement to complete a Schedule D for each station unduly burdensome and contrary to the public interest within the meaning of section 1.925(b)(3)(ii).<sup>70</sup>

PTC-220 requests permission to present the information required by Schedule D in a spreadsheet (attached to its application).<sup>71</sup> The 95-page spreadsheet provides location and other pertinent station parameters in a user-friendly format that can be analyzed by interested parties and FCC staff, rather than having to parse 6,113 Schedule D filings.<sup>72</sup> We find that Congress' PTC mandate and the application of section 1.913(b)—to the extent it would require PTC-220 to file 6,113 Schedule Ds to comply with that mandate—present unique factual circumstances and that it would be contrary to the public interest to require strict adherence to the rule.<sup>73</sup> For these reasons, we grant PTC-220's waiver request.

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antennas at 150 or more AGL). PTC-220 Engineering Report at 10-11 (the power of wayside stations (up to 76 watts ERP) and base stations (up to 400 watts ERP) is typically much greater than mobiles (up to 39 watts ERP)).

<sup>67</sup> This waiver extends to all locomotive radio operations under Call Sign WRKK374.

<sup>68</sup> 47 CFR § 1.3 (the Commission can waive any provision of its rules “for good cause shown”); *id.* § 1.925(b)(3)(ii).

<sup>69</sup> PTC-220 Schedule D Waiver Request at 1-2. Section 1.913(b) requires that “associated schedules . . . be filed electronically in accordance with the electronic filing instructions provided by ULS.” 47 CFR § 1.913(b). Schedule D is titled “Wireless Telecommunications Bureau and/or Public Safety and Homeland Security Bureau Schedule for Station Locations and Antenna Structures.” The Schedule D filing instructions state “[t]his schedule must be completed when any station location is to be added, modified, or deleted.” FCC Form 601, Schedule D – Instructions, at 1 (Mar. 2018). And that an applicant must “[u]se as many copies of Schedule D as necessary to provide information for all stations.” *Id.*

<sup>70</sup> PTC-220 Schedule D Waiver Request at 1; 47 CFR § 1.925(b)(3)(ii).

<sup>71</sup> PTC-220 Schedule D Waiver Request at 2.

<sup>72</sup> ULS File No. 0009583919, Schedule D PTC Site Data (filed Aug. 17, 2021).

<sup>73</sup> 47 CFR § 1.925(b)(3)(ii).



*Interference Analysis.* As required by section 80.215(h)(2) of the Commission's rules,<sup>74</sup> PTC-220's Engineering Report addresses the potential for interference from the proposed operation of PTC base and wayside radio stations to over-the-air (OTA) channel 10 and 13 receivers.<sup>75</sup> The report identifies all channel 10 stations within 129 kilometers (80 miles) of a PTC site.<sup>76</sup> The report also identifies 21 full power and 28 digital low power channel 13 stations within 169 kilometers (105 miles) of a PTC site.<sup>77</sup>

*Channel 10 Broadcast Stations.* Section 80.215(h)(1) of the Commission's rules requires applicants seeking to operate in the AMTS band to submit interference mitigation plans addressing the potential for interference to TV channel 10.<sup>78</sup> The Commission adopted this rule, which was intended to protect analog TV channel 10 receivers from intermodulation interference, before the digital television transition; however, the transition from analog to digital television has resulted in a lack of criteria to assess the potential for interference to digital channel 10 receivers.

OET-74 Supplement A states that "to assert compliance with the protection and mitigation requirements in [section 80.215(h)] regarding potential interference to channel 10, PTC applicants intending to operate in the AMTS band should briefly explain [1] that the transition to digital TV results in a lack of criteria to assess potential interference to channel 10, [2] that harmful interference to TV Channel 10 is unlikely, and [3] that if such interference is caused by PTC operations, it will be cured at the applicant's expense."<sup>79</sup>

PTC-220 excluded eleven channel 10 digital stations from its interference analysis.<sup>80</sup> Consistent with the requirements of OET-74 Supplement A, PTC-220's Engineering Report states that "the transition [from analog] to digital TV results in a lack of criteria to assess potential interference to digital transmissions on channel 10,"<sup>81</sup> and that the threat of harmful interference to digital channel 10 broadcast is not likely.<sup>82</sup> Further, PTC-220 acknowledges that it is responsible for curing any interference to

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<sup>74</sup> *Id.* § 80.215(h)(2).

<sup>75</sup> PTC-220 Engineering Report at 10.

<sup>76</sup> *Id.*, Appendix C.

<sup>77</sup> *Id.* at 5, Fig. 2 (Full Power Channel 13 Stations); and at 6, Fig. 3 (Digital LPTV Channel 13 Stations).

<sup>78</sup> 47 CFR § 80.215(h)(1).

<sup>79</sup> Longley-Rice Methodology for Predicting Inter-Service Interference to Broadcast Television from Mobile Wireless Broadband Services in the UHF Band, Supplement A – Guidance for Predicting Inter-Service Interference to Broadcast Television in the VHF Band from Positive Train Control (PTC) Systems, OET Bulletin No. 74, Supplement A at 5 (2017), <https://transition.fcc.gov/oet/info/documents/bulletins/oet74/OET74a-PTC.pdf> (OET-74 Supplement A).

<sup>80</sup> Appendix C to the PTC-220 Engineering Report identifies channel 10 stations within 129 kilometers of a PTC site in the license area.

<sup>81</sup> PTC Engineering Report at 23-24. *See also* OET-74 Supplement A at 5.

<sup>82</sup> PTC Engineering Report at 24.

viewers of OTA channel 10 television stations at its own expense.<sup>83</sup> We find that PTC-220 properly excluded channel 10 digital stations from the interference analysis.<sup>84</sup>

We emphasize that if a railroad's operations under Call Sign WRKK374 were to interfere with OTA reception of a channel 10 station, the railroad must remediate such interference at its own expense as required by section 80.215(h)(4)<sup>85</sup> and the interference mitigation conditions we adopt below.

*Channel 13 Broadcast Stations.* PTC-220 used the Commission's TVStudy software to determine the potential for the proposed PTC operations to interfere with channel 13 broadcast stations.<sup>86</sup> Using TV Study, it applied the Longley-Rice radio propagation model<sup>87</sup> to predict the number of television households that potentially could be affected by the operation of the proposed radio stations.<sup>88</sup> PTC-220 states that, consistent with OET-74 and OET-74 Supplement A, it calculated the number of potentially affected channel 13 households using a threshold desired/undesired (D/U) signal ratio of -33 dB.<sup>89</sup> PTC-220 used a matrix of square tiles—two kilometers per side for full power channel 13 stations and one kilometer per side for LPTV channel 13 stations—to identify the tiles with insufficient D/U ratio inside a television station's service area and the number of potential households within those tiles that potentially could be affected by the proposed PTC operations.<sup>90</sup>

Section 80.215(h)(3) of the Commission's rules provides for authorization of an AMTS station where a licensee shows that fewer than 100 households would be impacted by its operation.<sup>91</sup> However, a license must satisfy three requirements to obtain authorization of a station that potentially would impact more than 100 households.<sup>92</sup> Rather than providing data for each station, PTC-220 chose to aggregate the data for all stations.<sup>93</sup> PTC-220 predicts that, before undertaking interference mitigation, the aggregate transmissions of all the stations have the potential to affect 101,505 channel 13 TV households (1.4% of

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<sup>83</sup> *Id.*

<sup>84</sup> The report also includes an analysis of analog channel 10 LPTV stations within 129 kilometers of a PTC site in the license area. *Id.* at 25. These stations no longer provide analog service and it is, therefore, unnecessary to address PTC-220's related analysis here. See *Media Bureau Reminds Low Power Television and Television Translator Stations that the July 13, 2021, Digital Transition Date and Other Important Deadlines Are One Week Away*, Public Notice, DA No. 21-786, 2021 WL 2827304 (MB rel. July 6, 2021) (reminding LPTV stations that they must discontinue analog service by July 13, 2021).

<sup>85</sup> 47 CFR § 80.215(h)(4).

<sup>86</sup> PTC-220 Engineering Report at 7-8.

<sup>87</sup> Longley-Rice Methodology for Evaluating TV Service Coverage and Interference, OET Bulletin No. 69 (2004), <https://transition.fcc.gov/oet/info/documents/bulletins/oet69/oet69.pdf> (OET-69); Longley-Rice Methodology for Predicting Inter-Service Interference to Broadcast Television from Mobile Wireless Broadband Services in the UHF Band, OET Bulletin No. 74 (2015), <https://www.fcc.gov/bureaus/oet/info/documents/bulletins/oet74/OET74.pdf> (OET-74).

<sup>88</sup> PTC-220's study methodology included nine steps. PTC-220 Engineering Report at 13-14.

<sup>89</sup> *Id.* at 7-8.

<sup>90</sup> *Id.*

<sup>91</sup> 47 CFR § 80.215(h)(3).

<sup>92</sup> *Id.*

<sup>93</sup> PTC-220 Engineering Report at 10.

all households).<sup>94</sup> Given this aggregation, to analyze the potential impact on channel 13 TV households, we will assume for this specific analysis that each base and wayside station has the potential to impact more than 100 channel 13 TV households.

Under section 80.215(h)(3)(i)-(iii) of the Commission's rules, the Commission may approve a fixed AMTS station where 100 or more households are within the interference contour of that station and a television station's analog Grade B contour (here, PTC-220 used the TV stations' noise-limited service contours),<sup>95</sup> provided the applicant: (1) shows that the proposed site is the only suitable location (at the application stage, it is sufficient to establish that the site is especially well-suited to provide the proposed service); (2) develops a plan to control any interference caused to TV reception from its operations; and (3) agrees to make adjustments to TV receivers to eliminate interference caused by its operations.<sup>96</sup> We find that PTC-220 has satisfied the three requirements of section 80.215(h)(3)(i)-(iii).

First, PTC-220 certifies that, consistent with section 80.215(h)(3)(i), each of the proposed station locations are "especially well-suited to provide the proposed [PTC] service."<sup>97</sup> PTC-220 explains that "[b]ecause the proposed services are designed specifically for communications with trains, the sites must be placed in close proximity to railroad tracks and appropriately spaced to ensure a good quality signal along all segments of the tracks"<sup>98</sup>

Regarding the second and third requirements under section 80.215(h)(3), PTC-220 has developed a plan to mitigate potential interference (including free installation of notch filters if necessary)<sup>99</sup> for any household experiencing interference to their OTA reception of a channel 13 station, which it predicts would eliminate potential interference to all households.<sup>100</sup> Accordingly, we find that PTC-220 has satisfied the three requirements of section 80.215(h)(3)(i)-(iii) and hereby grant its application for

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<sup>94</sup> *Id.* at 5 and 20. PTC-220 also identified 12 analog low power channel 13 stations, located less than 169 kilometers (105 miles) from one or more radio station sites in the license area. *Id.* at 7. Three of these stations—K13ML (Hotchkiss, Colorado), K13QK (Virgin, Utah), and K13XW (Akron, Colorado)—recently transitioned to digital service, while the remaining stations either cancelled their license or will provide digital service on another channel. PTC-220 September 27, 2021 Update at 1. PTC-220 used TVStudy to analyze the potential of its operations to cause interference to the three stations' viewers and found that no households would be affected. *Id.*

<sup>95</sup> 47 CFR § 80.215(h)(3). Historically, the Commission analyzed the potential for interference according to a TV station's analog Grade B predicted contour. To account for the conversion to digital television, the Commission developed the noise-limited service contour (NLSC) to approximate the same probability of service as the analog Grade B contour. The NLSC is defined using the F(50,90) field strength contour, the area in which at least fifty percent of the locations can be expected to receive a signal that exceeds a specified field strength value at least ninety percent of the time. *See Establishment of a Model for Predicting Digital Broadcast Television Field Strength Received at Individual Locations*, ET Docket No. 10-152, Notice of Proposed Rule Making and Further Notice of Proposed Rule Making, 25 FCC Rcd 10474, 10485, para. 25 (2010). *See also Avista Corporation*, Order, 27 FCC Rcd 263, 266-67, paras. 6-7 (WTB MD 2012) (Longley-Rice propagation model and NLSC used to predict potential interference to DTV station by AMTS licensee).

<sup>96</sup> 47 CFR § 80.215(h)(3)(i)-(iii).

<sup>97</sup> PTC-220 Burns Certification.

<sup>98</sup> *Id.*

<sup>99</sup> A notch (band reject) filter attenuates one frequency band and passes both a lower and a higher frequency band.

<sup>100</sup> PTC-220 Engineering Report at 20-21.

permanent authority to operate the proposed 547 base stations and 5,566 wayside stations,<sup>101</sup> subject to the interference mitigation conditions we adopt below.

*Interference Mitigation Plan and Conditions.* Section 80.215(h)(4) of the Commission's rules requires AMTS licensees to eliminate interference from their fixed station operations to viewers' OTA reception of channels 10 and 13.<sup>102</sup> PTC-220's Interference Mitigation Plan describes and establishes a process for PTC-220 to comply with section 80.215(h)(4), including a 24-hour hotline to receive reports of interference from affected TV stations.<sup>103</sup>

PTC-220 will investigate whether a transmitter owned or controlled by a PTC-220 member-owner is the source of any reported interference.<sup>104</sup> If interference mitigation is required, PTC-220 has committed to resolve the interference by one of three possible measures. First, PTC-220 could change the frequency of the interfering transmitter either to another licensed AMTS frequency or to a frequency in the 220-222 MHz band on spectrum licensed to PTC-220.<sup>105</sup> Second, if a frequency change is not feasible, PTC-220 could modify the RF configuration of the site (*e.g.*, ERP, orientation, and tilt).<sup>106</sup> Third, if interference were to persist despite the foregoing measures or if such measures are impractical, then PTC-220 would provide free of charge, TV notch filters to affected viewers, which it predicts would eliminate interference caused to any affected TV receiver.<sup>107</sup> The filters have a minimum notch depth of 40 (+/-1) dB.<sup>108</sup> According to PTC-220, "in all cases the addition of a 40 dB notch filter mitigates predicted interference in all tiles that have population and housing units greater than zero."<sup>109</sup>

Although section 80.214(h)(4) of the Commission's rules provides AMTS licensees up to 90 days to resolve interference issues,<sup>110</sup> PTC-220 has committed to being more responsive and to resolve reports of interference within 60 days of receiving a report.<sup>111</sup> Consistent with the foregoing, as a condition of today's grant of permanent authority to operate the 547 PTC base and 5,566 wayside radio stations, we require PTC-220 to:

1. Establish and maintain a 24-hour helpdesk to receive reports of potential interference.

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<sup>101</sup> ULS File No. 0009583919, Revised Schedule D PTC Site Data (filed Aug. 7, 2021).

<sup>102</sup> 47 CFR § 80.215(h)(4).

<sup>103</sup> PTC-220 Engineering Report at 20 and PTC-220 Burns Certification (committing PTC-220, its member-owners, and non-member spectrum lessees to implement the interference mitigation measures).

<sup>104</sup> PTC-220 Engineering Report at 20.

<sup>105</sup> *Id.*

<sup>106</sup> *Id.*

<sup>107</sup> *Id.*

<sup>108</sup> *Id.*

<sup>109</sup> *Id.* at 19.

<sup>110</sup> 47 CFR § 80.215(h)(4).

<sup>111</sup> PTC-220 Engineering Report at 20. *See also* PTC-220 Burns Certification (committing PTC-220's member-owners to investigating reported interference within 30 days and resolving any interference within 60 days of a report). PTC-220 also states it "will require its non-member spectrum lessees to abide by the same interference resolution timelines." *Id.*

2. Provide each potentially affected broadcaster contact information to report possible interference to the helpdesk;<sup>112</sup>
3. Provide a party reporting interference a unique tracking number for each interference report;
4. Investigate any reported interference within 30 calendar days of receiving a report; and
5. Resolve any interference caused by its operations at its own expense within 60 calendar days of receiving an interference report.<sup>113</sup>

### III. CONCLUSION

For the reasons stated above, we hereby conditionally grant the License Modification Application and PTC-220's related waiver requests, ULS File No. 0009583919 (WRKK374).

Action taken pursuant to Sections 1, 4(i), and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 154(i), and 303(r), and sections 0.331, 1.913(b), 1.925(b)(3), and 80.215(h)-(j) of the Commission's rules, 47 CFR §§ 0.331, 1.913(b), 1.925(b)(3), and 80.215(h)-(j).

Sincerely,

Roger S. Noel  
Chief, Mobility Division  
Wireless Telecommunications Bureau

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<sup>112</sup> See PTC-220 Engineering Report at 5, Fig. 2 (channel 13 stations); *id.* at 6, Fig. 3 (LPTV channel 13 stations); *id.*, Appendix C (channel 10 stations); PTC-220 September 27, 2021 Update at 1 (channel 10 and 13 stations).

<sup>113</sup> If PTC-220 were unable to remedy interference, Commission rules would require it to discontinue use of an offending base or wayside radio station. 47 CFR § 80.215(h)(4).